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DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
WASHINGTON

Letter
Circular
LC 679

Revised to February 7, 1942

THERMAL EXPANSION OF SOLIDS: PUBLICATIONS BY MEMBERS OF THE STAFF OF THE NATIONAL BUREAU OF STANDARDS

Contents

I. GENERAL INFORMATION

The publications of the National Bureau of Standards for which prices are indicated may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, D. C. The prices quoted are for delivery to addresses in the United States, its territories and possessions, and in certain foreign countries which extend the franking privilege. In the case of all other countries, one-third the price of the publication should be added to cover postage. Remittances for publications (marked with a price) should not be made to the Department of Commerce or the National Bureau of Standards, but should be made directly to the Superintendent of Documents, United States Government Printing Office, Washington, D. C., by coupons (for sale by the Superintendent of Documents), postal money order, express order, or check. Currency may be sent at sender's risk. Foreign remittances should be made either by international money order or draft on an American bank. Foreign currency and foreign or domestic stamps will not be accepted.

"OP" in the column marked "Price" indicates that the publication is out of print, but may be consulted at depository libraries which have been designated by Congress to receive copies, as issued, of publications printed by the Government for public distribution.

"Outside publications" are not for distribution or sale by the Government. The National Bureau of Standards cannot supply copies of "outside" journals or reprints from them, and it is unable to furnish information as to their availability or price. These publications may be consulted at technical libraries or in some cases may be purchased directly from the publishers.

Series letters with serial numbers are used to designate publications of the National Bureau of Standards:

S = "Scientific Paper". S1 to S329 are "Reprints" from the "Bulletin of the Bureau of Standards". S330 to S572 were published as "Scientific Papers of the Bureau of Standards". This series was superseded by the "Bureau of Standards Journal of Research" in 1928.

T = "Technologic Paper". T1 to T370. This series was superseded by the "Bureau of Standards Journal of Research" in 1928.

RP = "Research Paper". RP1 to RP690 are reprints from the "Bureau of Standards Journal of Research". Research papers since July 1934 are reprints from the "Journal of Research of the National Bureau of Standards".

C = Circular.

Circular C24 and supplements give the complete list of the publications of the National Bureau of Standards (1901-1936), and may be purchased for 55 cents from the Superintendent of Documents, Government Printing Office, Washington, D. C. Announcement of new publications is made each month in the Technical News Bulletin of the National Bureau of Standards, which is obtainable from the Superintendent of Documents by subscription at 50 cents per year.

II. PUBLICATIONS OF THE NATIONAL BUREAU OF STANDARDS

The numbers assigned (for example, S352, T349, RP62) are the actual reprint numbers by which the National Bureau of Standards and the Government Printing Office lists and sells, respectively, the separate papers (reprints). In ordering Government publications from the Superintendent of Documents, Government Printing Office, Washington, D. C., please use the letter in connection with the number and title of the publication; for example, "S515, Thermal expansion of tungsten".

1. SCIENTIFIC PAPERS

	Series	Price
A simplified formula for the change in order of interference due to changes in temperature of air. I. G. Priest. Bul. BS 9 (1913)	S 199	5 ¢
Micrometer microscopes. A. W. Gray. Bul. BS 10 (No. 3, 1914)	S 215	25 ¢ *
Production of temperature uniformity in an electric furnace. A. W. Gray. Bul. BS 10, 451 (No. 4, 1914)	S 219	25 ¢ *
Protected thermoelements. A. W. Gray. Bul. BS 13 (No. 2, 1916)	S 276	25 ¢ *
Thermal expansion of alpha and of beta brass between 0 and 600° C, in relation to the mechanical properties of heterogeneous brasses of the Muntz metal type. P. D. Merica and L. W. Schad. Bul. BS 14, 571 (No. 4, 1919)	S 321	25 ¢ *
Preliminary determination of the thermal expansion of molybdenum. L. W. Schad and P. Hidnert. Sci. Pap. BS 15, 31 (1919-20).	S 332	OP
Heat treatment of duralumin. P.D. Merica, R. G. Waltenberg, and H. Scott. Sci. Pap. BS 15, 271 (1919-20). See page 297 for data on thermal expansion by P. Hidnert.	S 347	OP
Thermal expansion of insulating materials. W. H. Souder and P. Hidnert. Sci. Pap. BS 15, 387 (1919-20)	S 352	10 ¢
A new interferential dilatometer. I. G. Priest. Sci. Pap. BS 15, 669 (1919-20)	S 365	5 ¢
Measurements of thermal dilatation of glass at high temperatures. C. G. Peters and C. H. Cragoe. Sci. Pap. BS 16, 449 (1920)	S 393	OP
Thermal expansion of copper and some of its important industrial alloys. P. Hidnert. Sci. Pap. BS 17, 91 (1922)	S 410	25 ¢

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* For Quarterly number of the Bulletin in which the Scientific Paper appeared. This paper is not for sale as a separate paper.

SCIENTIFIC PAPERS (Cont'd)

	Series	Price
Thermal expansion of nickel, Monel metal, stellite, stainless steel, and aluminum. W. H. Souder and P. Hidnert. Sci. Pap. BS 17, 497 (1922)	S 426	10 ¢
Thermal expansion of a few steels. W. Souder and P. Hidnert. Sci. Pap. BS 17, 611 (1922)	S 433	OP
Application of the interferometer to measurements of the thermal dilatation of ceramic materials. G. E. Merritt. Sci. Pap. BS 19, 357 (1923-24)	S 485	OP
Thermal expansion of molybdenum. P. Hidnert and W. B. Gero. Sci. Pap. BS 19, 429 (1923-24)	S 488	10 ¢
Thermal expansion of aluminum and various important aluminum alloys. P. Hidnert. Sci. Pap. BS 19, 697 (1923-24)	S 497	OP
Thermal expansion of tungsten. P. Hidnert. Sci. Pap. BS 20, 483 (1924-26)	S 515	5 ¢
Measurements of the index of refraction of glass at high temperatures. C. G. Peters. Sci. Pap. BS 20, 635 (1924-26)	S 521	10 ¢
Pure zinc at normal and elevated temperatures. J. R. Freeman, Jr., F. Sillers, Jr., and P. F. Brandt. Sci. Pap. BS 20, 661 (1924-26). See page 663 for data on thermal expansion by W. Souder and P. Hidnert.	S 522	OP
Measurements on the thermal expansion of fused silica. W. Souder and P. Hidnert. Sci. Pap. BS 21, 1(1926-27)	S 524	10 ¢
Density and electrical properties of the system, rubber-sulphur. H. L. Curtis, A. T. McPherson and A. H. Scott, Sci. Pap. BS 22, 383 (1927-28)	S 560	15 ¢
Thermal expansion of beryllium and aluminum-beryllium alloys. P. Hidnert and W. T. Sweeney. Sci. Pap. BS 22, 533 (1927-28)	S 565	10 ¢

SCIENTIFIC PAPERS (Cont'd)

	Series	Price
Thermal expansion of alloys of the "stainless iron" type. P. Hidnert and W. T. Sweeney. Sci. Pap. BS 22, 639 (1927-28)	S 570	10 ¢

2. TECHNOLOGIC PAPERS

Observations on finishing temperatures and properties of rails. G. K. Burgess, J. J. Crowe, H. S. Rawdon, and R. G. Waltenberg. Tech. Pap. BS 4 (1914). See discussion in Trans. Am. Inst. Min. Eng. 50, 306 (1915).	T 38	35 ¢
Comparative tests of chemical glassware. P. H. Walker and F. W. Smither. Tech. Pap. BS 10 (1918). Data on thermal expansion by C. G. Peters	T 107	OP
Physical and chemical tests on the commercial marbles of the United States. D. W. Kessler. Tech. Pap. BS 12 (1919). See section XX for data on thermal expansion by L. W. Schad and P. Hidnert.	T 123	OP
Cements for spark-plug electrodes. H. F. Staley. Tech. Pap. BS 13 (1920)	T 155	OP
An investigation of the physical properties of dental materials. W. H. Souder and C. G. Peters. Tech. Pap. BS 13 (1920)	T 157	10 ¢
Porosity and volume changes of clay fire bricks at furnace temperatures. G. A. Loomis. Tech. Pap. BS 13 (1920)	T 159	OP
Thermal stresses in chilled iron car wheels. G. K. Burgess and R. W. Woodward. Tech. Pap. BS 16, 193 (1921-22). Data on thermal expansion by W. H. Souder and P. Hidnert.	T 209	OP
Properties of electrical insulating materials of the laminated phenol-methylene type. J. H. Dellinger and J. L. Preston. Tech. Pap. BS 16, 501 (1921-22). Data on thermal expansion by W. H. Souder and P. Hidnert.	T 216	OP

TECHNOLOGIC PAPERS (Cont'd)

	Series	Price
Thermal stresses in steel car wheels. G. K. Burgess and G. ..Quick. Tech. Pap. BS 17, 367 (1922-24). See pages 371 and 372 for data on thermal expansion of rolled steel wheels by W. H. Souder and P. Hidnert, and of a c st steel wheel by C. G. Peters	T 235	OP
Properties of potters' flints and their effects in white-ware bodies. E. E. Pressler and V. L. Shearer. Tech. Pap. BS 20, 289 (1925-26). See page 304 for data on thermal expansion by interferometry section of Bureau of Standards.	T 310	OP
Thermal expansion of graphite. P. Hidnert and W. T. Sweeney. Tech. Pap. BS 21, 223 (1926-27)	T 335	OP
Physical properties of the principal commercial limestones used for building construction in the United States. D. V. Kessler and W. H. Sligh. Tech. Pap. BS 21, 497 (1926-27). See page 522 for data on thermal expansion by W. H. Souder and P. Hidnert.	T 349	30 ¢

3. RESEARCH PAPERS

Thermal expansion of magnesium and some of its alloys. P. Hidnert and W. T. Sweeney. BS J. Research 1, 771 (1928)	RP 29	OP
Physical properties of dental materials (gold alloys and accessory materials). R. L. Coleman. BS J. Research 1, 867 (1928)	RP 32	35 ¢
Fire resistance of hollow load-bearing wall tile. S. H. Ingberg and H. D. Foster. BS J. Research 2, 1 (1929)	RP 37	75 ¢
Thermal expansion of tantalum. P. Hidnert. BS J. Research 2, 887 (1929)	RP 62	5 ¢
Preparation of experimental sagger bodies according to fundamental properties. R.A. Heindl and L. E. Hong. BS J. Research 3, 419 (1929)	RP 104	OP
Progress report on investigation of fire-clay bricks and the clays used in their preparation. R. A. Heindl and W. L. Pendergast. BS J. Research 3, 691 (1929)	RP 114	15 ¢

RESEARCH PAPERS (Cont'd)

	Series	Price
Melting, mechanical working, and some physical properties of rhodium. W. H. Swanger. BS J. Research 3, 1029 (1929). See page 1039 for data on thermal expansion by W. T. Sweeney.	RP 127	10 ¢
Fire clays; some fundamental properties at several temperatures. R. A. Heindl and W.L. Pendergast. BS J. Research 5, 213 (1930)	RP 194	10 ¢
Dimensional changes caused in glass by heating cycles. A. Q. Tool, D. B. Lloyd, and G. E. Merritt. BS J. Research 5, 627 (1930)	RP 219	10 ¢
The properties of pure nickel. L. Jordan and W. H. Swanger. BS J. Research 5, 1291 (1930). See page 1305 for data on thermal expansion by P. Hidnert.	RP 257	10 ¢
Dimensional changes in the manufacture of electrolytes. N. Bekkedahl and W. Blum. BS J. Research 6, 829 (1931)	RP 308	10 ¢
Volume changes in brick masonry materials. L. A. Palmer. BS J. Research 6, 1003 (1931)	RP 321	10 ¢
The determination of the coefficient of cubical expansion of solid benzoic acid by means of a gas-filled dilatometer. E. R. Smith. BS J. Research 7, 903 (1931)	RP 382	OP
The life of the sagger as affected by varying certain properties. R. A. Heindl and L. E. Mong. BS J. Research 7, 1017 (1931)	RP 387	OP
Thermal expansion of heat-resisting alloys: nickel-chromium, iron-chromium, and nickel-chromium-iron alloys. P. Hidnert. BS J. Research 7, 1031 (1931)	RP 388	25 ¢
A method for determining the volume changes occurring in metals during casting. C. M. Saeger, Jr., and E. J. Ash. BS J. Research 8, 37 (1932)	RP 399	10 ¢
Kaolins; effect of firing temperatures on some of their physical properties. R. A. Heindl, W. L. Pendergast, and L. E. Long. BS J. Research 8, 199 (1932)	RP 410	5 ¢

RESEARCH PAPERS (Cont'd)

	Series	Price
Volume changes of cast irons during casting. E. J. Ash and C. M. Saeger, Jr. BS J. Research 8, 601 (1932)	RP 440	5 ¢
Thermal expansion of some silicates of elements in Group II of the periodic system. R. F. Geller and H. Insley. BS J. Research 9, 35 (1932)	RP 456	OP
"Moisture expansion" of ceramic white ware. R. F. Geller and A. S. Creamer. BS J. Research 9, 291 (1932)	RP 472	OP
A study of some ceramic bodies of low absorption maturing at temperatures below 1000° C. R. F. Geller and D. N. Evans. BS J. Research 9, 473 (1932)	RP 483	OP
Thermal expansion of lead. P. Hidnert and W. T. Sweeney. BS J. Research 9, 703 (1932)	RP 500	5 ¢
The interference method of measuring thermal expansion. G. E. Merritt. BS J. Research 10, 59 (1933)	RP 515	5 ¢
The thermal expansion of refractories to 1800° C. R. A. Heindl. BS J. Research 10, 715 (1933)	RP 562	5 ¢
Thermal expansion of columbium. P. Hidnert and H. S. Krider. BS J. Research 11, 279 (1933)	RP 590	5 ¢
Effects of particle size of a potter's "flint" and a feldspar in whiteware. R. F. Geller, D. N. Evans, and A. S. Creamer. BS J. Research 11, 327 (1933)	RP 594	OP
Effect of heat treatment on the expansivity of a Pyrex glass. J. B. Saunders and A. Q. Tool. BS J. Research 11, 799 (1933)	RP 626	OP
Olivine as a refractory. R. A. Heindl. BS J. Research 12, 215 (1934)	RP 645	5 ¢
Thermal expansion of bearing bronzes. P. Hidnert. BS J. Research 12, 391 (1934)	RP 665	5 ¢
Thermal expansions of some soda-lime-silica glasses as functions of the composition. B. C. Schmid, A. N. Finn, and J. C. Young. BS J. Research 12, 421 (1934)	RP 667	OP

RESEARCH PAPERS (Cont'd)

	Series	Price
Thermal expansion of artificial graphite and carbon. P. Hidnert. J. Research NBS 13, 37 (1934)	RP 693	5 ¢
The System: PbO - SiO_2. R. F. Geller, A. S. Creamer, and E. N. Bunting. J. Research NBS 13, 237 (1934)	RP 705	OP
Forms of rubber as indicated by the temperature volume relationship. N. Bekkedahl. J. Research NBS 13, 411 (1934)	RP 717	5 ¢
Autographic thermal expansion apparatus. W. Souder. P. Hidnert, and J. F. Fox. J. Research NBS 13, 497 (1934)	RP 722	5 ¢
Compression tests of structural steel at elevated temperatures. P. D. Sale. J. Research NBS 13, 713 (1934)	RP 741	OP
Calibrations of the line standards of length of the National Bureau of Standards. L. V. Judson and B. L. Page. J. Research NBS 13, 757 (1934)	RP 743	5 ¢
Young's modulus of elasticity at several temperatures for some refractories of varying silica content. R. A. Heindl and W. L. Pendergast. J. Research NBS 13, 851 (1934)	RP 747	5 ¢
Specific volume, compressibility, and volume thermal expansivity of rubber-sulphur compounds. A. H. Scott. J. Research NBS 14, 99 (1935)	RP 760	5 ¢
Index of refraction, density, and thermal expansion of some soda-alumina-silica glasses as functions of the composition. C. A. Faick, J. C. Young, D. Hubbard, and A. N. Finn. J. Research NBS 14, 133 (1935)	RP 762	OP
Thermal expansion of monocrystalline and polycrystalline antimony. P. Hidnert. J. Research NBS 14, 523 (1935)	RP 784	5 ¢
A study of sagger clays and sagger bodies. R. A. Heindl. J. Research NBS 15, 255 (1935)	RP 827	5 ¢
Electrical-resistance alloys of copper, manganese, and aluminum. J. L. Thomas. J. Research NBS 16, 149 (1936). See page 159 for data on thermal expansion by P. Hidnert.	RP 863	5 ¢

RESEARCH PAPERS (Cont'd)

	Series	Price
Thermal expansion of copper-beryllium alloys. P. Hidnert. J. Research NBS 16, 529 (1936)	RP 890	5 ¢
Thermal expansion of lead-antimony alloys. P. Hidnert. J. Research NBS 17, 697 (1936)	RP 938	10 ¢
Some physical properties of isoprene. N. Bekkedahl, L. A. Wood, and M. Wojciechowski. J. Research NBS 17, 883 (1936)	RP 951	5 ¢
Thermal expansion of cemented tungsten carbide. P. Hidnert. J. Research NBS 18, 47 (1937)	RP 960	5 ¢
Some "soft" glazes of low thermal expansion. R. F. Geller, E. N. Bunting, and A. S. Creamer. J. Research NBS 20, 57 (1938)	RP 1064	5 ¢
Fire-clay ladle sleeves. R. A. Heindl and G. J. Cooke. J. Research NBS 20, 411 (1938)	RP 1084	OP
Thermal expansion and effects of heat treatments on the growth, density and structure of some heat-resisting alloys. P. Hidnert. J. Research NBS 20, 809 (1938)	RP 1106	25 ¢ *
Expansion effects on the inversion of silica crystals in certain devitrified glasses. A. Q. Tool and J. B. Saunders. J. Research NBS 21, 773 (1938)	RP 1153	5 ¢
Thermal-expansion characteristics of some ground-coat enamel frits. W. N. Harrison, B. J. Sweo and S. M. Shelton. J. Research NBS 22, 127 (1939)	RP 1172	5 ¢
Improved interferometric procedure with application to expansion measurements. J. B. Saunders. J. Research NBS 23, 179 (1939)	RP 1227	10 ¢
Length changes and endothermic and exothermic effects during heating of flint and aluminous clays. R. A. Heindl and L. E. Hong. J. Research NBS 23, 427 (1939)	RP 1243	5 ¢
Application of the interferometer to the measurement of dimensional changes in rubber. L. A. Wood, N. Bekkedahl, and C. G. Peters. J. Research NBS 23, 571 (1939)	RP 1253	5 ¢

* For June number of the Journal in which the Research Paper appeared. This paper is not for sale as a separate paper.

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RESEARCH PAPERS (Cont'd)

	Series	Price
Thermal expansion of some chromium-vanadium steels. P. Hidnert. J. Research NBS 24, 25 (1940)	RP 1269	5 ¢
Length changes of whiteware clays and bodies during initial heating, with supplementary data on mica. R. F. Geller and E. N. Bunting. J. Research NBS 25, 15 (1940)	RP 1311	10 ¢
Thermal expansion of electrolytic chromium. P. Hidnert. J. Research NBS 26, 81 (1941)	RP 1361	5 ¢
Some factors affecting the properties of ceramic talcose whiteware. R. F. Geller and A. S. Creamer. J. Research NBS 26, 213 (1941)	RP 1371	10 ¢
Comparative tests of chemical glassware. E. Wichers, A. N. Finn, and W. S. Clabaugh. J. Research NBS 26, 537 (1941). See page 539 for data on thermal expansion by P. Hidnert, L. H. Maxwell, and J. B. Saunders.	RP 1394	10 ¢
Thermal expansion of cast and of swaged chromium. P. Hidnert. J. Research NBS 27, 113 (1941)	RP 1407	5 ¢
Thermal expansion of clay building bricks. C. W. Ross. J. Research NBS 27, 197 (1941)	RP 1414	10 ¢
Thermal expansion studies of boric oxide glass and of crystalline boric oxide. J. J. Donoghue and D. Hubbard. J. Research NBS 27, 371 (1941)	RP 1425	5 ¢
A resistor furnace, with some preliminary results up to 2000° C. R. F. Geller. J. Research NBS 27, 555 (1941). Data on thermal expansion by A. S. Creamer.	RP 1443	5 ¢
Expansivity of a Vycor brand glass. J. B. Saunders. J. Research NBS 28, 51 (1942)	RP 1445	5 ¢

4. CIRCULARS

Invar and related nickel steels (2nd edition). Circular BS No. 58 (1923)	C 58	OP
Testing of line standards of length. L. V. Judson. Circular BS No. 332 (1927)	C 332	10 ¢
Physical properties of dental materials. W. Souder and G. C. Paffenbarger. Circular NBS C433 (1941)	C433	75 ¢

III. ARTICLES PUBLISHED IN OUTSIDE JOURNALS

The reference numbers (for example, OJ-1, OJ-2, etc.) in the following lists of publications in outside journals, are merely arbitrary numbers assigned here to indicate sequence in this letter circular and for easy reference in the index. They have nothing to do with any designating numbers which may be applied by the publishers.

Bulletin of the American Ceramic Society
(2525 North High St., Columbus, Ohio)

	Reference No.
Effect of repeated heatings on the mechanical strength of high-tension insulator porcelains. R. F. Geller, Bul, Am. Ceramic Soc. 12, 18 (1933)	OJ-1

Journal of the American Ceramic Society
(2525 North High St., Columbus, Ohio)

Relation between the composition and the thermal expansivity of porcelains. F. H. Riddle. J. Am. Ceramic Soc. 2, 804 (1919). Data on thermal expansion by W. H. Souder and P. Hidnert.	OJ-2
The causes and control of fish scaling of enamels for sheet iron and steel. R. R. Danielson and W. H. Souder. J. Am. Ceramic Soc. 4, 620 (1921)	OJ-3
Thermal expansion of fused quartz. G. E. Merritt. J. Am. Ceramic Soc. 7, 803 (1924)	OJ-4
A study of mullite refractories formed by calcining cyanite, their industrial application. M. L. Freed. J. Am. Ceramic Soc. 9, 249 (1926)	OJ-5
Interferometer measurements of the thermal dilatation of glazed ware. G. E. Merritt and C. G. Peters. J. Am. Ceramic Soc. 9, 327 (1926)	OJ-6
Progress report on investigation of sagger clays.-- Some observations as to the significance of their thermal expansion. R. F. Geller and R. A. Heindl. J. Am. Ceramic Soc. 9, 555 (1926)	OJ-7
The effect of calcined cyanite in porcelain bodies. S. J. McDowell and E. J. Vachuska. J. Am. Ceramic Soc. 10, 64 (1927)	OJ-8
Bureau of Standards investigation of feldspar.-- Second progress report. R. F. Geller. J. Am. Ceramic Soc. 10, 411 (1927)	OJ-9

Journal of the American Ceramic Society (Cont'd)

Reference No.

Methods for testing crazing of glazes caused by increases in size of ceramic bodies. H. G. Schurecht. J. Am. Ceramic Soc. 11, 271 (1928) — OJ-10

Progress report on investigation of sagger clays. Preparation of experimental bodies according to fundamental properties. R. A. Heindl and L. E. Mong. J. Am. Ceramic Soc. 12, 457 (1929) — OJ-11

Progress report on investigation of fireclay brick and the clays used in their preparation. R. A. Heindl and W. L. Pendergast. J. Am. Ceramic Soc. 12, 640 (1929) — OJ-12

The influence of chemical composition on the physical properties of glazes. F. P. Hall. J. Am. Ceramic Soc. 13, 182 (1930) — OJ-13

Fire clays. Some fundamental properties at several temperatures. R. A. Heindl and W. L. Pendergast. J. Am. Ceramic Soc. 13, 725 (1930) — OJ-14

Investigation of feldspar and its effect in pottery bodies. R. F. Geller and A. S. Creamer. J. Am. Ceramic Soc. 14, 30 (1931) — OJ-15

Progress report on investigation of sagger clays. The life of the sagger as affected by varying certain properties. R. A. Heindl and L. E. Mong. J. Am. Ceramic Soc. 14, 867 (1931) — OJ-16

Selection of clays for saggers of predetermined resistance to thermal shock and prediction of sagger life in service. R. A. Heindl and L. E. Mong. J. Am. Ceramic Soc. 16, 601 (1933) — OJ-17

Talc in whiteware bodies of the wall-tile type. R. F. Geller and A. S. Creamer. J. Am. Ceramic Soc. 18, 259 (1935) — OJ-18

Transactions of the American Electrochemical Society
(Columbia University, New York, N.Y.)

The thermal expansion of some fused oxides used as refractories. G. T. Merritt. Trans. Am. Electrochem. Soc. 50, 165 (1926) — OJ-19

Transactions of the American Foundrymen's Association
(Chicago, Ill.)

Reference No.

Methods for determining the volume changes undergone by metals and alloys during casting. C. M. Saeger, Jr., and E. J. Ash. Trans. Am. Foundrymen's Assoc. 38, 107 (1930) — 0J-20

Transactions of the American Institute of Metals
(29 West 39th St., New York, N. Y.)

Physical tests on common high brass taken parallel and at right angles to the direction of rolling. W. P. Price and P. Davidson. Trans. Am. Inst. Metals 10, 133 (1916). See appendix (pages 151 to 164) for data on thermal expansion by L. W. Schad and P. Hidnert. — 0J-21

Transactions of the American Institute of Mining and Metallurgical Engineers
(29 West 39th St., New York, N.Y.)

The coefficient of expansion of alloy steels, J. A. Mathews. Trans. Am. Inst. Min. Met. Eng. 67, 133 (1922). See page 135 for data on thermal expansion by P. Hidnert. — 0J-22

Austenite and austenitic steels. J. A. Mathews. Trans. Am. Inst. Min. Met. Eng. 71, 568 (1925). See page 575 for data on thermal expansion by P. Hidnert and W. T. Sweeney (Chemical composition of samples C-25-0 and CN-21-7 should be changed to Cr 23.7, Ni 6.8 percent and Cr 26.5, Ni 0.34 percent, respectively). — 0J-23

American Refractories Institute
(Oliver Bldg., Pittsburgh, Pa.)

The significance of the elasticity and thermal expansion of fire-clays with reference to the spalling of the fired product. R. F. Geller. Am. Refractories Inst., Tech. Paper 4 (Oct. 1927) — 0J-24

Transactions of the American Society for Steel Treating
(7016 Euclid Ave., Cleveland, Ohio)

Some effects of hydrogen on iron and their bearing on a reported transformation at 370 degrees Cent. (698 degrees Fahr.). H. S. Rawdon, P. Hidnert and W. A. Tucker. Trans. Am. Soc. Steel Treating 10, 233 (1926) — 0J-25

Ceramic Industry
(59 East Van Buren St., Chicago, Ill.)

Reference No.

Ceramic bodies of low absorption maturing below 1000 Deg. C. R. F. Geller and D. N. Evans. Ceramic Ind. 20, 32 (1933) — OJ-26

The Chemical News
(Merton House, Salisbury Square, London, E.C.4, England)

Thermal expansion of tungsten. P. Hidnert and W. T. Sweeney. Chem. News 132, 144 (1926) — OJ-27

Measurements on the thermal expansion of fused silica. W. Souder and P. Hidnert. Chem. News 133, 105 (1926) — OJ-28

Industrial and Engineering Chemistry
(American Chemical Society, 20th & Northampton Sts., Easton, Penna.)

Comparative tests of chemical glassware. E. Wichers, A. N. Finn and W. S. Clabaugh. Ind. Eng. Chem., Analytical Edition, 13, 419 (1941). See page 419 for data on thermal expansion by P. Hidnert, L. H. Maxwell and J. B. Saunders. — OJ-29

Metals and Alloys
(Reinhold Publishing Corp., East Stroudsburg, Pa.)

Some physical properties of commercial thorium. J. G. Thompson. Metals and Alloys 4, 114 (1933). See pages 117 and 118 for data on thermal expansion by P. Hidnert and W. T. Sweeney. — OJ-30

Metals Handbook of American Society for Metals
(7016 Euclid Ave., Cleveland, Ohio)

Coefficients of linear expansion of S.A.E. steels. Table compiled by A.S.M. Committee on Linear Expansion of Steels (P. Hidnert, Chairman, and following members: J. B. Austin, W. H. Brandt, H. Masumoto and A. Pérard). 1939 Edition. — OJ-31

The Metal Industry
(The Louis Cassier Co., Ltd., 22 Henrietta St., Covent Garden, London, W.C. 2, England)

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